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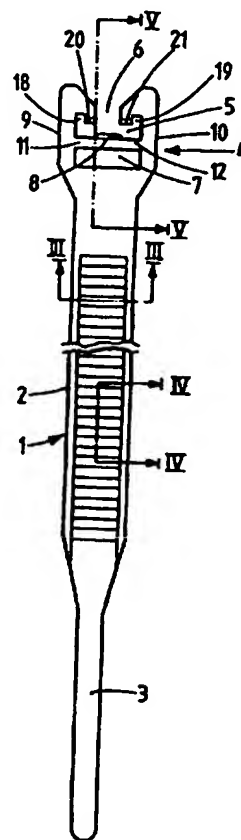
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In English translation (filed in Swedish).

(54) Title: BUNDLE TIE

(57) Abstract

A bundle tie comprises an elongate band member (2) having a width exceeding its thickness, an elongate insertion member (3) which is connected to one end of the band member and has a smaller width than the band member, a locking head (4) which is connected to the other end of the band member and which has not only a throughgoing opening (5) extending substantially transversely of the band member closest to the locking head and being adapted to receive a portion of the band member, but also a slit (6) extending in the longitudinal direction of the opening from the latter to the outside of the locking head and being adapted for the insertion of a portion of the insertion member into the throughgoing opening preparatory to the band member being pulled into this opening, as well as cooperating locking teeth (20, 21) arranged on the band member and in the throughgoing opening. Further, the locking head (4) is formed with a throughhole (7) in the longitudinal direction of the opening (5) and on the side of the opening (5) opposite to the slit (6). A bridge (8) formed between the hole and the opening is resiliently connected to opposite longitudinal sides (9, 10) of the locking head.



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BUNDLE TIE

The present invention generally relates to a fastening element which is intended to keep objects, such as wire bundles, together. To be more specific, the invention concerns a bundle tie comprising an elongate band member having a width exceeding its thickness, an elongate insertion member which is connected to one end of the band member and has a smaller width than the band member, a locking head which is connected to the other end of the band member and which has not only a throughgoing opening extending substantially transversely of the band member closest to the locking head and being adapted to receive a portion of the band member, but also a slit extending in the longitudinal direction of said opening from the latter to the outside of the locking head and being adapted for the insertion of a portion of the insertion member into the throughgoing opening preparatory to pulling the band member into this opening, and cooperating locking teeth arranged on the band member and in the throughgoing opening.

SE 367,803 teaches a bundle tie of the above type. However, the locking head of this bundle tie is far from fulfilling the two requirements that have to be placed on the locking head proper, namely that it should be easy and expedient to pull the band member through the opening in the locking head and that the band member should be protected from being pulled out of the opening once it has been fastened. In the prior-art bundle tie, the first requirement is met by imparting a certain resilience to the claw-shaped elements delimiting the opening and the slit in the locking head. This resilience does, however, adversely affect protection against the band member being pulled out after fastening.

Furthermore, US 3,837,047 discloses another bundle tie, whose opening however extends in parallel with the

band member adjacent to the locking head. As a result, one cannot, when inserting the band member in the locking head, hold the band member but one has to hold the locking head, which renders mounting more difficult and, hence, excessively time-consuming.

However, the bundle ties available on today's market are usually provided with a closed locking head, such that the band member has to be run through the locking head in the way a needle is threaded. It goes without saying that this is a time-consuming operation, even if the locking head is angled so that the opening therein extends transversely of the band member closest to the locking head.

The object of this invention is to obviate the drawbacks of the prior-art bundle ties by providing a bundle tie which is of the type described by way of introduction and which further can be manufactured in an injection moulding machine of simplified design, by which is meant such a machine as can be opened in one direction without any separate back movements for releasing the injection-moulded component.

According to the invention, the above object is attained by a bundle tie which is characterised in that the locking head is formed with a throughhole in the longitudinal direction of the opening and on a side of the opening that is opposite to the slit, and that a bridge formed between said hole and said opening is resiliently connected to opposite longitudinal sides of the locking head.

Owing to the inventive provision of the hole and the bridge, the above-mentioned two requirements placed on the locking head are met. To be more specific, this is achieved as a result of the bridge imparting the required yieldingness enabling the band member to be easily and expediently pulled into the opening, while at the same time increasing the stiffness of the claw-like portions otherwise delimiting the opening and the slit. Further-

more, the inventive design of the locking head enables the bundle tie according to the invention to be manufactured with the aid of injection moulding machines of the simplified design described above. It goes without saying  
5 that the manufacture of the bundle tie is thus simplified as well as rendered less expensive.

The resilient bridge may, along its entire length, be connected to the remainder of the locking head. Alternatively, the bridge may be connected to the remainder  
10 of the locking head along but part of its length, for instance by means of a pin. Preferably, the band member of the bundle tie is of U-shaped cross-section, having a web determining the width of the band member, as well as flanges determining the thickness of the band member. On  
15 the side facing away from the bridge, the throughgoing opening in the locking head has projecting portions corresponding to the free flanges of the band member. As a result of this design, the claw-like portions delimiting the throughgoing opening and the slit are prevented from  
20 being displaced away from each other, which further ensures the retention of the band member in the throughgoing opening after fastening of the bundle tie.

In one embodiment of the bundle tie according to the invention, the cooperating locking teeth arranged on the  
25 band member and in the throughgoing opening may be disposed on the web of the band member between the flanges thereof, as well as in the throughgoing opening between the portions corresponding to the free flanges of the band member.

30 Yet another object of the invention is to enable expedient dismounting of the bundle tie when need be.

In the bundle tie according to the invention, this is achieved by the locking head, in the throughgoing opening for receiving the band member, having locking  
35 teeth arranged on the bridge to cooperate with the locking teeth of the band member after the band member has been inserted in the throughgoing opening with the free

ends of the flanges facing the bridge. Naturally, the locking teeth on the bridge should be directed opposite to the locking teeth between the portions corresponding to the free flanges of the band member. In this case, the expedient dismounting is made possible by bevelling the band member externally at the longitudinal edges between the flanges and the web. However, secure locking can be achieved with the aid of a separate sealing pin, which can be introduced into the hole in order to prevent the bridge from moving resiliently in the direction away from the slit. Of course, this sealing pin can be used regardless of the direction of insertion of the band member into the opening.

The invention will now be described in more detail with reference to the accompanying drawings, in which Fig. 1 is a schematic plan view of an embodiment of the bundle tie according to the invention,

Fig. 2 is a side view of the bundle tie of Fig. 1 when in closed position,

Fig. 3 is a cross-section taken along line III-III in Fig. 1, showing a band member of the bundle tie,

Fig. 4 is a longitudinal section taken along line IV-IV in Fig. 1, showing the band member of the bundle tie,

Fig. 5 is a cross-section taken along line V-V in Fig. 1, showing a locking head of the bundle tie,

Fig. 6 is a cross-section similar to Fig. 5, showing an alternative design of the locking head, and

Figs 7 and 8 are larger-scale views of the locking head in Fig. 1, showing the inserted band member in two different positions.

Thus, Fig. 1 illustrates a bundle tie 1 comprising a band member 2 which has a width exceeding its thickness, as appears from Fig. 3. Furthermore, the bundle tie 1 comprises an elongate insertion member 3 which is connected to one end of the band member 2 and which has a smaller width than the band member 2. Finally, the bundle

tie 1 includes a locking head 4 connected to the other end of the band member 2. This locking head 4 is formed with a throughgoing opening 5, which extends essentially transversely of the band member 2 closest to the locking head 4 and is adapted to receive a portion of the band member 2. Moreover, the locking head 4 has a slit 6 which extends in the longitudinal direction of the opening 5 from the latter to the outside of the locking head 4 and is adapted for the insertion of a portion of the insertion member 3 into the throughgoing opening 5 preparatory to the band member 2 being pulled into this opening 5.

In accordance with the invention, the locking head 4 further has a throughhole 7 extending in the same direction through the locking head 4 as the opening 5, more specifically on that side of the opening 5 which is opposite to the slit 6. There is thus formed a bridge 8, which is resiliently connected to opposite longitudinal sides 9, 10 of the locking head 4 by means of strips 11, 12 formed integral with the bridge 8. As shown in Fig. 5, the strips 11, 12 extend along the entire length of the bridge. Alternatively, the bridge 8 may, as shown in Fig. 6, be connected to the longitudinal sides 9, 10 of the locking head along but part of its length, for instance by means of a pin 13 which extends perpendicularly to the longitudinal direction of the opening 5 and about which the bridge 8 is resilient through torsion.

As illustrated in Fig. 3, the band member 2 is of U-shaped cross-section, having a web 14 determining the width of the band member 2, as well as flanges 15, 16 determining the thickness of the band member 2. On the web 14 between the flanges 15, 16, the band member 2 is provided with locking teeth 17, as is shown most clearly in Fig. 4.

The throughgoing opening 5 for receiving the band member 2 has portions 18, 19 projecting from the side facing away from the bridge 8 and corresponding to the free flanges 15, 16 of the band member 2. Also, locking

teeth 20, 21 are provided in the throughgoing opening 5 between the portions 18, 20 as well as on each side of the slit 6. Thus, the longitudinal sides 9, 10 of the locking head 4 constitute claw-shaped portions kept together by the bridge 8.

Fig. 7 illustrates in more detail the position of the band member 2 in the locking head 4 when the band member 2 has been pulled into the locking head 4 in the direction indicated by dashed lines in Fig. 2. To be more specific, the locking teeth 17 of the band member 2 here engage the locking teeth 20, 21 of the locking head 4, while at the same time the free ends of the band-member flanges 15, 16 engage the portions 18, 19. Finally, the web portion of the band member 2 rests on the upper side of the bridge 8, such that the band member 2 occupies a perfectly fixed position in the opening 5 of the locking head 4.

To be more specific, the band member 2 may be applied against a row of locking teeth 22 on the side of the bridge 8 facing the slit 6. The purpose of the locking teeth 22 will be explained in more detail below with reference to Fig. 8.

Thus, Fig. 8 shows the locking head 4, the band member 2 being inserted in the opening 5 in the direction indicated by full lines in Fig. 2. Thus, the free ends of the flanges 15, 16 will be applied against the strips 11, 12, and the locking teeth 17 of the band member 2 will engage the locking teeth 22 on the bridge 8. The web 14 of the band member 2 will at least partly be applied against the locking teeth 20, 21. As illustrated in Fig. 8, the band member 2 is, furthermore, externally bevelled at the longitudinal edges between the flanges 15, 16 and the web 14. As a result, the bundle tie 1 can be expediently dismounted. More specifically, the band member 2 is rotated in the opening 5 while the claw-shaped portions 9, 10 are bent outwards, whereupon the band



member 2 can be lifted up through the slit 6, the bundle tie having thus been dismantled.

5 In order to prevent the band member 2 from being released from the locking head 4 when the bundle tie is mounted as shown in Fig. 8, a sealing pin 23 may, as shown in Fig. 6, be introduced into the hole 7 and be fixed therein. As appears from Fig. 5, the fixing pin 23 is formed integral with the locking head 4. Naturally, the sealing pin 23 may also be used to further secure  
10 the bundle tie in fastened position in accordance with Fig. 7.

As appears from Figs 5 and 6, but a few locking teeth 20-22 are required on the locking head 4, preferably 1-4 teeth. Furthermore, the locking teeth 22 are  
15 spaced apart from the locking teeth 20, 21 in the longitudinal direction of the opening 5, thereby to facilitate the operation of pulling the band member 2 into the opening 5.

It goes without saying that several modifications of  
20 the above embodiments of the bundle tie according to the invention are conceivable within the scope of the invention, as defined by the appended claims.

## CLAIMS

1. A bundle tie comprising  
5 an elongate band member (2) having a width exceeding its thickness,  
an elongate insertion member (3) which is connected to one end of the band member and has a smaller width than the band member,  
10 a locking head (4) which is connected to the other end of the band member and which has not only a throughgoing opening (5) extending substantially transversely of the band member closest to the locking head and being adapted to receive a portion of the band member, but also  
15 a slit (6) extending in the longitudinal direction of said opening from the latter to the outside of the locking head and being adapted for the insertion of a portion of the insertion member into the throughgoing opening preparatory to pulling the band member into this opening,  
20 and  
cooperating locking teeth (17, 20, 21, 22) arranged on the band member and in the throughgoing opening,  
characterised in that  
the locking head (4) is formed with a throughhole  
25 (7) in the longitudinal direction of the opening (5) and on a side of the opening (5) that is opposite to the slit (6), and  
a bridge (8) formed between said hole and said opening is resiliently connected to opposite longitudinal  
30 sides (9, 10) of the locking head.
2. A bundle tie as set forth in claim 1, characterised in that the resilient bridge (8) is, along its entire length, connected to the remainder of the locking head (4).
- 35 3. A bundle tie as set forth in claim 1, characterised in that

the resilient bridge (8) is connected to the remainder of the locking head (4) along but part (13) of its length.

4. A bundle tie as set forth in any one of claims  
5 1-3, characterised in that

the band member (2) is of U-shaped cross-section, having a web (14) determining the width of the band member as well as flanges (15, 16) determining the thickness of the band member.

10 5. A bundle tie as set forth in claim 4, characterised in that

the locking head (4) has, in the throughgoing opening (5) for receiving the band member (2), locking teeth (22) arranged on the bridge to cooperate, after the band  
15 member has been inserted in the throughgoing opening with the free ends of the flanges (15, 16) facing the bridge (8), with locking teeth (17) arranged on the web (14) of the band member between the flanges (15, 16).

20 6. A bundle tie as set forth in claim 5, characterised in that

the band member (2) is externally bevelled at its longitudinal edges between the flanges (15, 16) and the web (14).

25 7. A bundle tie as set forth in any one of claims 4-6, characterised in that

the locking head (4) has, in its throughgoing opening (5) for receiving the band member (2), locking teeth (20, 21) arranged between the portions (18, 19) corresponding to the free flanges of the band member to cooperate, after the band member has been inserted in the  
30 throughgoing opening with the free ends of the flanges (15, 16) facing away from the bridge (8), with locking teeth (17) arranged on the web (14) of the band member between the flanges (15, 16).

35 8. A bundle tie as set forth in claim 7, characterised in that

the locking teeth (22) arranged on the bridge are directed opposite to, and in the longitudinal direction of the opening (5) spaced apart from, the locking teeth (20, 21) arranged between the portions (18, 19) corresponding to the free flanges (15, 16) of the band member (2).

9. A bundle tie as set forth in any one of claims 4-8, characterised in that

the throughgoing opening (5) for receiving the band member (2) has portions (18, 19) projecting from the side that faces away from the bridge (8) and corresponding to the free flanges (15, 16) of the band member.

10. A bundle tie as set forth in any one of claims 1-10, characterised in that

there is provided a sealing pin (23) that can be inserted in the hole in order to prevent the bridge (8) from moving resiliently in the direction away from the slit (6).



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FIG. 5

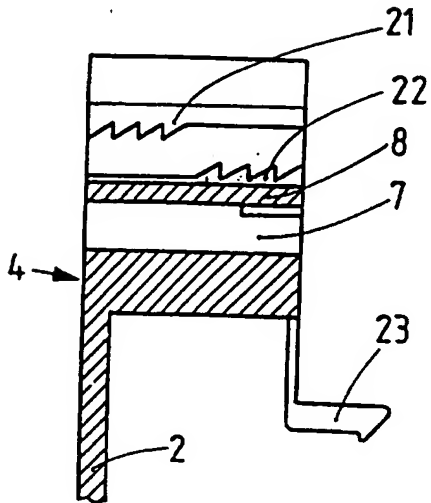


FIG. 6

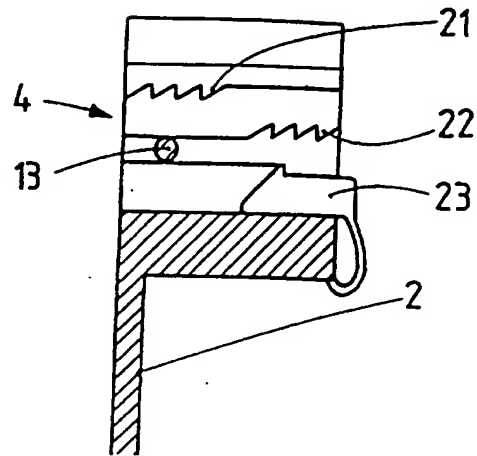


FIG. 7

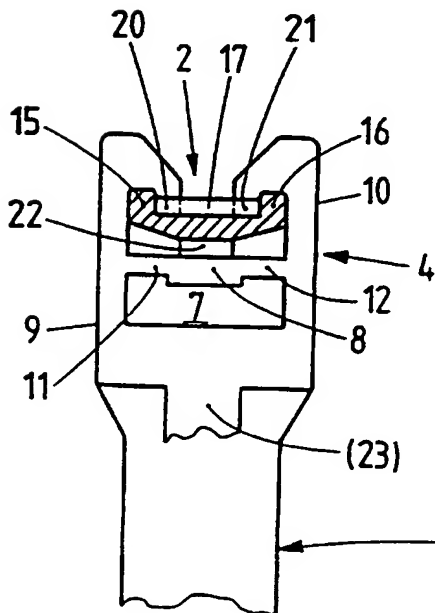
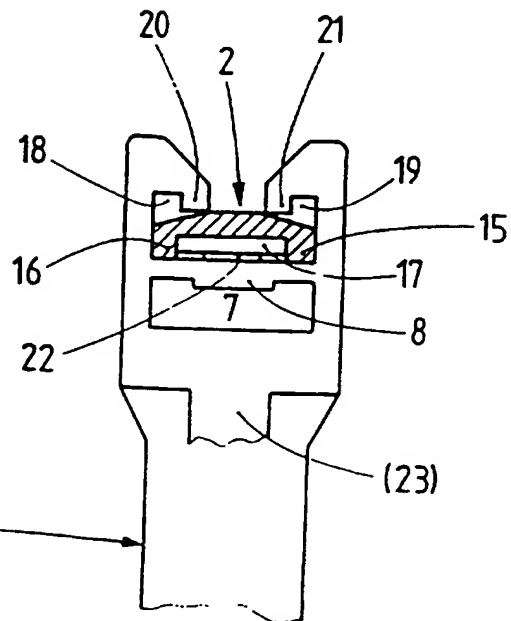


FIG. 8



**SUBSTITUTE SHEET**

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 95/01500

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B65D 63/10

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 1168600 A (ETABLISSEMENTS COLSON), 10 December 1958 (10.12.58), figure 2 --	1-10
A	DE 3427693 A1 (VERGARI, GUIDO), 7 February 1985 (07.02.85), figure 3 --	1-10
A	Patent Abstracts of Japan, Vol 14, No 181, M-961, abstract of JP, A, 2-32967 (SK KOKI K.K.), 2 February 1990 (02.02.90) --	1-10
A	SE 367803 B (THOMAS & BETTS CORPORATION), 10 June 1974 (10.06.74), figure 1 --	1-10



Further documents are listed in the continuation of Box C.



See patent family annex.

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 95/01500

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3837047 A (BUNNELL), 24 Sept 1974 (24.09.74), figure 1  ----- --	1-10



**INTERNATIONAL SEARCH REPORT**

Information on patent family members

05/02/96

International application No.

PCT/SE 95/01500

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
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			GB-A-	2145150	20/03/85
SE-B-	367803	10/06/74	BE-A,A-	756222	16/03/71
			DE-A-	2046011	15/04/71
			FR-A,A-	2062181	25/06/71
			GB-A-	1276044	01/06/72
			NL-A-	7013717	19/03/71
			US-A-	3576054	27/04/71
US-A-	3837047	24/09/74	NONE		